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COMPLEMENTARY DESCRIPTION OF THE WINGED STAGES OF *ELECTROGENA BRAASCHI* (EPHEMEROPTERA, HEPTAGENIIDAE)

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Complementary Description of the Winged Stages of *Electrogena braaschi* (Ephemeroptera, Heptageniidae). Godunko R. J., Prokopov G. A., Kłonowska-Olejnik M. — The male subimago and female imago of *Electrogena braaschi* (Sowa, 1984) from the central and southern parts of the Crimean Peninsula are described and illustrated. Complementary description of male imago, female subimago and egg is given. Data on the distribution and ecology of the species are provided.

Key words: Ephemeroptera, Heptageniidae, *Electrogena*, Ukraine, Crimea.

Дополнительное описание крылатых стадий *Electrogena braaschi* (Ephemeroptera, Heptageniidae). Годунько Р. И., Прокопов Г. А., Клоновска-Олейник М. — Описаны и изображены субимаго самца и имаго самки вида *Electrogena braaschi* (Sowa, 1984) из центральной и южной частей Крыма. Приводится дополнительное описание имаго самца, субимаго самки и яйца. Представлены сведения по распространению и экологии вида.

Ключевые слова: Ephemeroptera, Heptageniidae, *Electrogena,* Украина, Крым.

Introduction

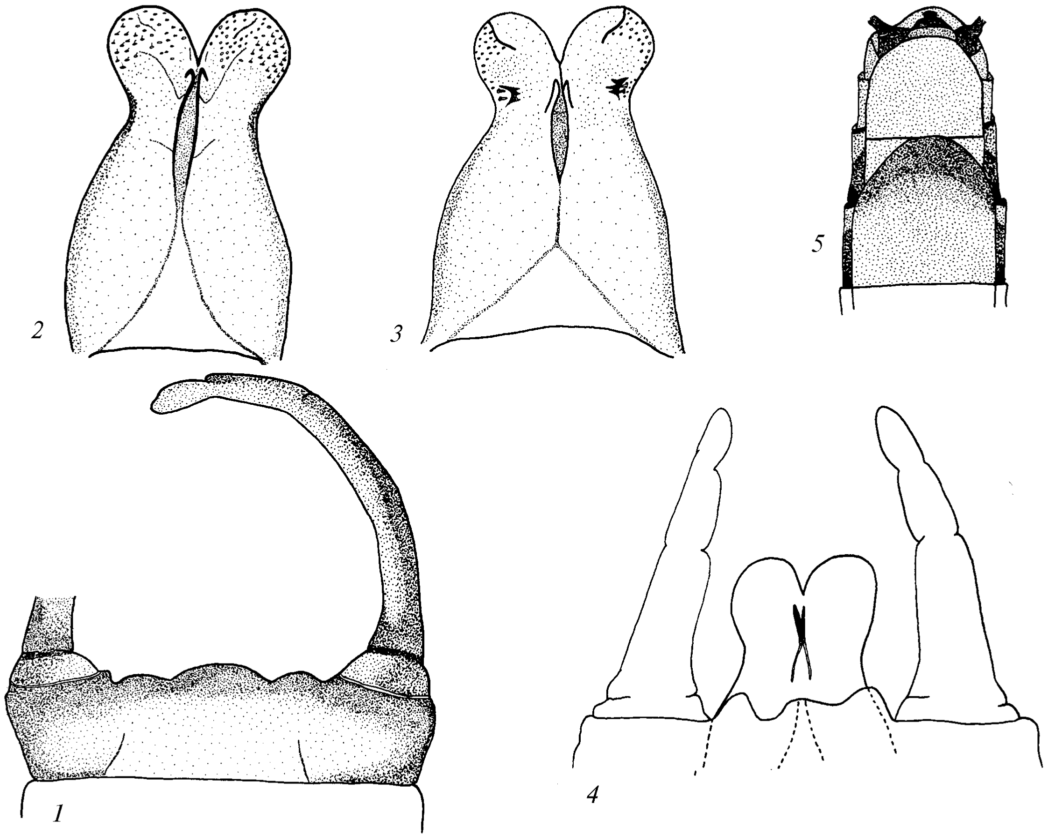
Sowa (1984) originally described *Ecdyonurus braaschi* Sowa and considered this species to belong to the *lateralis* group. From morphological peculiarities of its larval and adult stages this species must be transferred to the genus *Electrogena* Zurwerra & Tomka, 1985. The type series was collected by Dietrich Braasch in the upper part of Bel'bek (in the original description "Beljbek") stream, sources of which are situated on the northern slopes of Aïpetryns'ka Yaïla (in the original description "Aipetričeskaya Yalta") in region of height-climatic subalpine belt, which is typical for the Crimean mountains. During last years *E. braaschi* was considered as a component of the zoobenthos of Crimean running waters. Kiseleva (1993, 1997) mentioned this species as "*Ecdyonurus* gr. *lateralis*" and "*Ecdyonurus lateralis*" from the pre-mountain part of the Crimean Peninsula. The data on ecology of this endemic species were absent hitherto. Based on the material from rivers of central and southern parts of the Crimean Peninsula, the supplemental diagnosis of larval stages was given by Godunko (2000).

The male subimago and female imago stayed unknown. In this paper the distribution of all winged stages is given based on the material from streams of central and southern parts of the Crimean Peninsula. The main collection site was in upper part of Khosta Bash River flowing on the southern slope of Aypetry Yayla close to its type locality.

Electrogena braaschi (Sowa, 1984)

Ecdyonurus braaschi Sowa, 1984: 182; *Ecdyonurus* gr. *lateralis*: Kiseleva, 1993: 163; *Ecdyonurus lateralis*: Kiseleva, 1997: 40; *Electrogena braaschi* (Sowa): Godunko, 2000: 64.

Material. ♂ subimago, ♀ subimago, Crimea, upper part of Kacha River, Crimean Reserve, 28.05.1999; 4 ♂ imago, 3 ♀ imago with larval and subimaginal skin, 4 ♂ subimago, 11 ♀ subimago, Crimea, upper part of Khosta-Bash River, near preface Miskhor (southern Yalta town), Yalta Mountain Forest Reserve, 31.05.1999; 3 imago, 3 subimago, 2 ♀ imago, Crimea, upper part of Kyzyl-Koba River, near Pereval'ne vil., 2.06.1999; ♂ subimago, 4 ♀ subimago, the Crimea, upper part of Burul'cha river, 3.05.1999 (Godunko, Prokopov); ♂ imago, 6 ♀ imago, Crimea, upper part of Auzun-Uzen' River. 12.06.1999 (Prokopov).



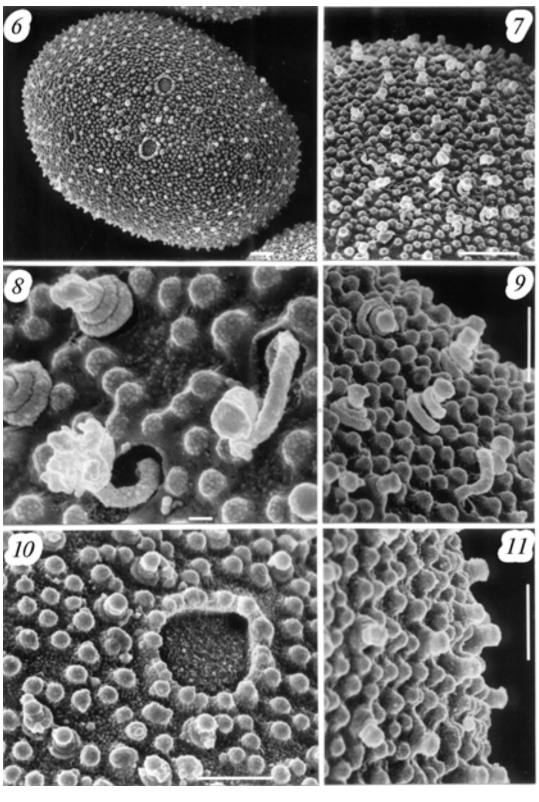


Рис. 1. *Electrogena braaschi*, ♂ имаго (*1–3*), ♂ субимаго (*4*), ♀ имаго (*5*) и яйцо (*6–11*): *1* — стилигер и фрагмент форцепсов, вентрально; *2* — лопасти пениса, вентрально; *3* — лопасти пениса, дорсально; *4* — гениталии, вентрально; *5* — задняя часть брюшка, вентрально; *6* — общий вид яйца (масштаб 10 мкм); *7* — поверхность хориона (масштаб 5 мкм); *8* — поверхность хориона с малыми шишкообразными спирально закрученными нитями и бугорками (заметен участок матрикса) (масштаб 1 мкм); *9* — поверхность хориона с малыми шишкообразными спирально закрученными нитями и бугорками, латерально (масштаб 5 мкм); *10* — микропиле (масштаб 5 мкм); *11* — поверхность хориона с малыми шишкообразными спирально закрученными нитями и бугорками, латерально (масштаб 5 мкм).

Fig. 1. *Electrogena braaschi*, ♂ imago (*1–3*), ♂ subimago (*4*) and ♀ imago (*5*) and egg (*6–11*): *1* — styliger and fragment of forceps, ventral view; *2* — lobe of penis, ventral view; *3* — lobe of penis, dorsal view; *4* — genitalia, ventral view; *5* — posterior part of abdomen, ventral view; *6* — general view of egg (scale bar 10 μm); *7* — chorionic surface (scale bar 5 μm); *8* — chorionic surface with small KCT and tubercles (ground matrix visible) (scale bar 1 μm); *9* — chorionic surface with KCT and tubercles, lateral view (scale bar 5 μm); *10* — micropyle (scale bar 5 μm); *11* — chorionic surface with KCT and tubercles, lateral view (scale bar 5 μm).

Description. Male imago (in alcohol, freshly collected material). Body length 8.0—11.0 mm; fore wing 8.0—11.0 mm; cerci 23.0—26.0 mm. Eyes large, globular, dark without band. Head light brown. Thorax dark brown, pleurae yellowish-white. Fore wings transparent, vitreous, pterostigmatic area distinctly lactescent. Venation dark, cross veins simple. Costa and subcosta light brown basally. Femora, tibiae and tarsi of fore legs dark brown. Middle and hind legs light, almost hyaline, femora and tibiae pale yellowish-brown, tarsi rather dark, slightly brown. Terga I—IX light brown or yellowish with two reddish-brown connected spots near fore corners or with a stripe widened to lateral margins. Sterna of abdomen dark brown with hardly visible violet ganglia. Cerci dark brown. Styliger dark brown. Its lateral lobes extend up to base of first forceps article and separated from each other by a distinct median connexity (fig. 1, *1*). Penis lobes light brown, asymmetrical with outer and posterior rounded margins. Interior margin relatively straight. Lobes close to each other, slightly truncate at end. Space between them distinctly V-shaped (fig. 1, *2*). Penis widest basally, its stem relatively long. Titillators simple, without teeth. Dorsal side of penis lobes with a basal protuberance bearing 2—4 large and several small denticles (fig. 1, *3*).

Male subimago. Body length 8.0—9.5 mm; fore wing 10.0—11.0 mm; cerci 9.0—13.0 mm. Eyes dark, without band. Fore wings pale, greyish with dark grey venation. Colour of abdomen terga and legs similar to male imago. Sterna light brown with well visible violet nervous ganglia. Styliger plate markedly protruding, lateral lobes large and rounded. Cerci light brown. Penis lobes rounded apically. Space between lobes V-shaped (fig. 1, *4*). Basal protuberance on dorsal side with well visible denticles.

Female imago. Body length 10.0—14.0 mm; fore wing 11.0—15.0 mm; cerci 11.5—16.0 mm. Body colour similar to male imago and slightly pale. Eyes dark. Fore wings transparent with well visible dark brown longitudinal and cross veins. Pterostigmatic area lactescent with simple cross veins. Colour legs like to male imago. Sterna of abdomen with well visible violet nervous ganglia. Posterior abdominal segments in ventral view as in figure 1, *5*. Subgenital plate with posterior margin slightly rounded. Apical outline of subanal plate similar to subgenital plate outline. Cerci yellow-brownish.

Female subimago. Body length 10.0—12.5 mm; fore wing 11.5—14.0 mm; cerci 9.0—12.5 mm. Colour of body and eyes similar to that of male subimago. Sterna IX—X yellowish, paler than other. Cerci yellowish, dark brown at their base.

Egg oval. Size: length 138—143 μm; width: 100—107 μm (fig. 1, *6*). Chorionic surface rugose, with numerous tubercles and attachment structures (fig. 1, *7*). Tubercles are small and round (diameter 1—1.4 μm); distance between adjacent tubercles ranging from 0.4 to 1.8 μm (fig. 1, *9, 10*). Chorionic surface and tubercles covered by very delicate granular ground matrix (visible at high magnification) (fig. 1, *8, 10*). Attachment structures, characterised by knob-terminated coiled threads (KCT) (Koss, Edmunds, 1974) are only one kind (fig. 1, *8, 9, 11*). They are small (diameter 1.2—1.6 μm) and rather sparsely scattered over egg surface; distance between KCT ranging from 3—6 μm (fig. 1, *7*). 3—6 micropyles are found in subequatorial area (fig. 1, *10*). Sperm guide is ovoid, 6—8 μm long and 5.5—6.5 μm width (micropylar opening situated at side). Micropylar rim thick, with tubercles like those from chorion surface.

E. braaschi eggs most resemble those of *Electrogena grandiae* (Belfiore): (chorion rugose with tubercles and KCT attachment structures which are more or less of same size and are equally distributed over chorion surface) (Gaino et al., 1987).

Distribution and ecology. So far, *E. braaschi* is known only from mountain area of Crimean Peninsula. Considering relative isolation of Crimean Mountains from other eastern, southern and central European mountain systems and significant part of endemic species among other aquatic insects, we suppose that *E. braaschi* is a Crimean endemic.

Larvae of *E. braaschi* represent the main component in both number and biomass of Ephemeroptera, as our study on the water flows show. Larvae were found along

whole profile of the stream, both in its rapid parts and sections with slow flow. This species inhabits large and medium stones on coarse gravel in the mid- and little streams (current velocity 1–1.5 m/s). Specimens occurred at the altitude of 300 to 800 m. a. s. l. Summer temperature in the examined water flows was 8–15°C. Peculiarities of life cycle of this species are not known.

The SEM photographs of the eggs were made on a scanning electron microscope JEOL JSM 5410 at the Department of Cytology and Hydrology of the Jagiellonian University, Krakyw. We are indebted to Mrs. J. Faber for technical assistance.

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